Midterm 1
October 05, 2004
Instructor: Charles Cuell

Na[...]

Stu[...]

All solutions are to be presented on the exam paper. Each question is worth two (2) marks. A disorganized or messy solution will result in a mark of zero for that question. *There are twelve (12) questions in total.* Time for the exam is **80 minutes**.

(1) Find the solution set of $x^2 + x - 20 \geq 0$

$(x - 4)(x + 5) \geq 0$

$x^{+4}_{-4} \geq 0^{+4}$

$x \geq 4$

$X: \left\{ (-\infty, -5] \cup [4, \infty) \right\}$

$x \geq 4$

$x + 5 \geq 0$

$x \geq -5$

$x + 5 \geq 0$

$x \geq -5$

(2) Find the solution set of $|x^2 - 4| > 0$.

$x^2 - 4 > 0$

$\sqrt{x^2 > 4}$

$x > 2$

$4 - x^2 > 0$

$\sqrt{4 > x^2}$

$\pm 2 x$

$X: \left\{ (-\infty, -2) \cup (2, \infty) \right\}$

(3) Evaluate the following:
   (a) $\tan(\frac{\pi}{4}) = \sqrt{2}$

$y = \pi$

$x = 4$

$r^2 = 4^2 + \pi^2$

$\frac{1}{2}$

(b) $\sin(\frac{7\pi}{6}) = -\sqrt{3}$

$-\frac{1}{2}$

(c) $\cos(\frac{-\pi}{3}) = \sqrt{3}$ $\frac{2}{\sqrt{3}}$
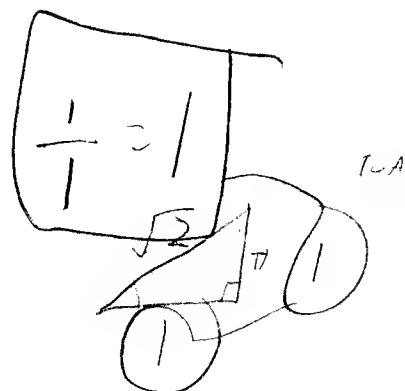
(4) Find the domain of

2

$$f(x) = \frac{\sqrt{4 - x^2}}{x - 2}.$$

$D: [-2, 2]$

$D: x \in \mathbb{R}, x \neq 2$

$\sqrt{4 - x^2}$

$D_{f(x)}: [-2, 2)$

(5) Find the domain of

C

$$f(x) = \frac{x}{e - e^x}$$ $x = \mathbb{R}$

$\rightarrow$ when $x = 1$

the der...

is

(6) Find the solution set of $x \sin x - x = 0$ on the interval $[-\pi, \pi]$.

$x(\sin x - 1)$
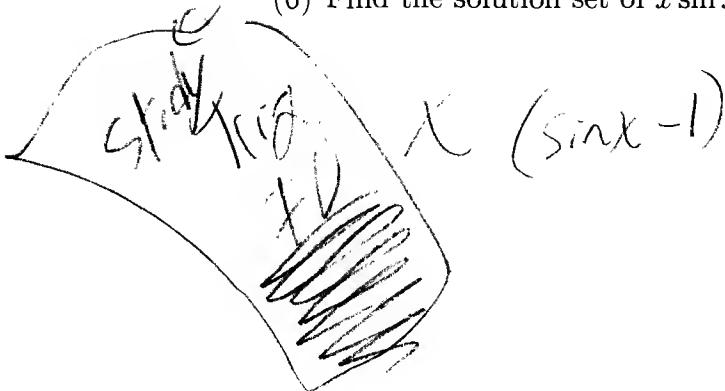
(7) Let

$$f(x) = \frac{x^2 - 2x + 1}{x + 1}.$$

Evaluate $f(-2) = $ ~~−9~~

(8) Plot the graph of $f(x) = (\frac{1}{2})^x$. Plot at least one known point on the graph.
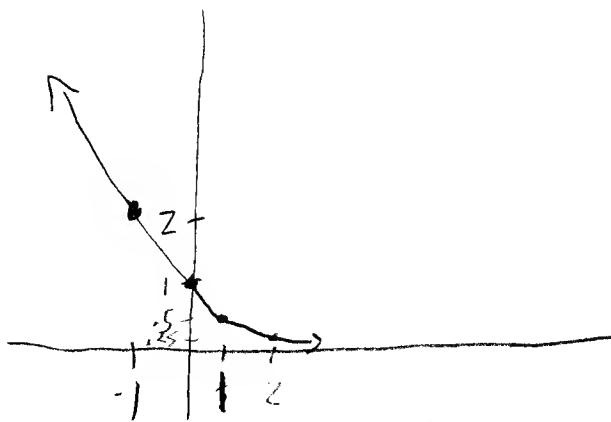

(9) Plot the graph of $f(x) = \cos x$, on the interval $[0, 2\pi]$. Include all the points where $\sin x$ is maximum, minimum and zero.
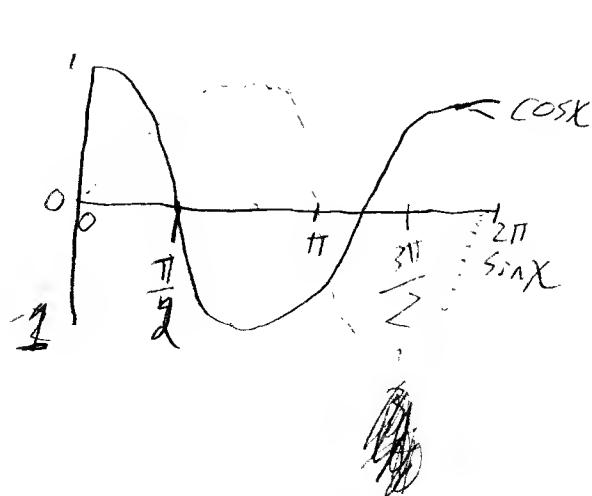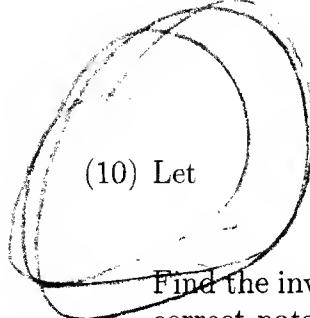
(10) Let

Seck
90

$$f(x) = \frac{x-1}{x+1}.$$

Find the inverse of $f(x)$ and the domain of the inverse. Use the
correct notation for the inverse.

$$y = \frac{x-1}{x+1}$$

$$x = \frac{y-1}{y+1}$$

$$D_{f^{-1}} = x \in \mathbb{R}$$

(11) Evaluate

(a) $\sin^{-1}(\frac{1}{\sqrt{2}}) = 1$

$45^\circ \quad \frac{\pi}{4}$

(b) $\tan^{-1}(\sqrt{3}) = \frac{1}{2}$

60°
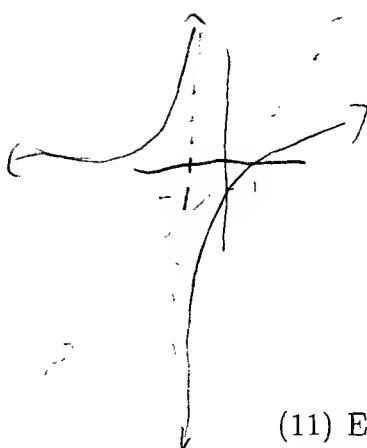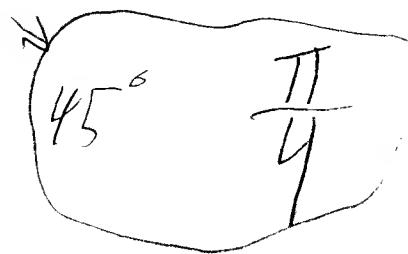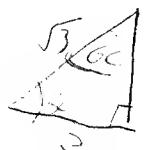
(12) Let $f(x) = (x-1)^2$. Graph $f(x)$ and the secant line that goes
through $x = 1$ and $x = 2$. What is the equation of this line?

$y - 0 = x(-1)$

$y = x - 1$